

## Claims

1. A gain control circuit for causing a power level of a signal to converge on a power level reference signal, said circuit being arranged, in a first  
5 adjustment, to determine whether the power level of said signal falls within a predetermined range containing the power level reference signal and, if not, to adapt said signal in a manner predetermined to cause the power level of said adapted signal to fall within said predetermined range and, in a second  
10 adjustment, to measure the power level of said adapted signal and to further adapt said adapted signal using the measured power level of said adapted signal thereby causing the power level of said further adapted signal to converge on the power level of said reference signal.
2. A gain control circuit according to claim 1 arranged such that  
15 convergence of the power level of the signal on the power level reference signal is achieved by adapting said signal in the predetermined manner and further adapting the adapted signal.
3. A gain control circuit according to claim 1 or 2 arranged to determine  
20 whether the power level of said signal falls within the predetermined range containing the power level reference signal by checking whether the power level has clipped.
4. A gain control circuit according to claim 1 or 2 arranged to determine  
25 whether the power level of said signal falls within the predetermined range containing the power level reference signal by determining whether an average power level of said signal falls within another predetermined range.

5. A gain control circuit according to claim 4, wherein said another measurement range provides a measurement range limit tolerance to take account of signal averaging errors.
- 5 6. A gain control circuit according to any preceding claim arranged to adapt the power level of said signal by a predetermined amount.
7. A gain control circuit according any preceding claim arranged to adapt the power level of said signal by causing a change in gain by a predetermined  
10 factor.
8. A gain control circuit according to claim 7 arranged to adapt the power level of said signal by selecting a one of a plurality of fixed gains of an amplifier.
- 15 9. A gain control circuit according to claim 7 or 8 arranged to adapt the power level of said signal by selecting a one of three fixed gains of an amplifier.
- 20 10. A gain control circuit according to claim 9 arranged initially to select a first fixed gain having an intermediate gain and thereafter to adapt the power level of said signal by selecting a second, lower or a third, higher fixed gain.
11. A gain control circuit according to any preceding claim arranged to  
25 measure the power level of said adapted signal by comparing the power level of said adapted signal with the power level reference signal so as to determine an error value.
12. A gain control circuit according to claim 11 arranged to further adapt  
30 said adapted signal by causing a change in gain related to the error value.

13. A gain control circuit according to any preceding claim arranged to adapt said signal using a relatively coarse adjustment and to further adapt said adapted signal using a relatively fine adjustment.

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14. A gain control circuit according to any preceding claim, wherein said signal includes first and second consecutive signal portions and wherein the gain control circuit is arranged to determine during the first signal portion whether the power level of said signal falls within the predetermined range  
10 containing the power level reference signal and, if not, to adapt said signal in the predetermined manner thereby causing the power level of said adapted signal to fall within said predetermined range and to measure during the second signal portion the power level of said adapted signal and to further adapt said adapted signal using the measured power level of said adapted  
15 signal thereby causing the power level of said further adapted signal to converge on the power level of said reference signal.

15. A gain control circuit according to any preceding claim for controlling first and second amplifiers.

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16. A gain control circuit according to claim 15, including first and second outputs for controlling gains of said first and second amplifiers respectively.

17. A gain control circuit according to claim 15 or 16, configured to instruct  
25 said first amplifier to change gain so as to adapt said signal in the predetermined manner.

18. A gain control circuit according to claim 17, configured to instruct said second amplifier to change gain so as to further adapt said adapted signal.

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19. A gain control circuit according to any one of claims 15 to 18, configured to instruct said first amplifier to change gain only once during said first and second adjustments.
- 5 20. A gain control circuit according to any preceding claim, wherein the predetermined range is a gain control circuit measurement range.
21. A gain control circuit according to claim 20, wherein said measurement range is a range which is reliably measured.
- 10 22. A gain control circuit according to claim 20 or 21, wherein said measurement range includes a positive limit and a zero limit.
23. A gain control circuit according to claim 20 or 21, wherein said  
15 measurement range includes a positive limit and a negative limit.
24. A gain control circuit according to any preceding claim, which is arranged, in the first adjustment, to appropriately adapt said signal by an amount corresponding to a standard/product defined maximum magnitude of  
20 the signal outside a proximal measurement range limit so as to bring the signal within the measurement range.
25. A gain control circuit according to any preceding claim conforming to a 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> or 4<sup>th</sup> generation telecommunications standard or a derivative  
25 standard, wherein a maximum standard/product defined signal magnitude is derived from said standard.
26. A gain control circuit according to any preceding claim, which is arranged, in the first adjustment, to adapt said signal by a different amount  
30 according to which predetermined range limit the signal is outside.

27. A radio receiver including a gain control circuit according to any preceding claim and further including first and second amplifiers.
- 5 28. A radio receiver according to claim 27, wherein the gain control circuit is arranged to determine whether the power level of said signal falls within the predetermined range by checking whether an output of said component has clipped.
- 10 29. A radio receiver according to claim 27 or 28, wherein the gain control circuit is arranged to check a predetermined number of samples of said output of said component.
30. A gain control circuit or radio receiver according to according to any  
15 preceding claim wherein the predetermined range is a dynamic range of an electric component or circuit.
31. A gain control circuit or radio receiver according to according to any preceding claim configured to cause the power level of the signal to converge  
20 on the power level reference signal using no more than two adjustments.
32. A radio receiver substantially as hereinbefore described with reference to Figures 1 to 8 of the accompanying drawings.
- 25 33. A method of gain control for causing a power level of a signal to converge on a power level of a reference signal, the method comprising:  
in a first adjustment: determining whether the power level of said signal falls within a predetermined range containing the power level reference signal and, if not, adapting said signal in a manner predetermined to cause the power  
30 level of said adapted signal to fall within said predetermined range and,

in a second adjustment: measuring the power level of said adapted signal and further adapting said adapted signal using the measured power level of said adapted signal thereby causing the power level of said further adapted signal to converge on the power level of said reference signal.

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34. A method of gain control according to claim 33 using no more than two adjustments.

35. A method of gain control substantially as hereinbefore described with  
10 reference to Figures 1 to 8 of the accompanying drawings.

36. A computer program for performing the method of claim 33.